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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a voice recording device, a sound reproduction device, a speech processing unit, the more detailed voice recording device in which record or reproduction of index information data is possible, a sound reproduction device, and a speech processing unit.

[0002]

[Description of the Prior Art]From before, sounds, such as conversation in a meeting, are changed into the audio signal which is an electrical signal using a microphone, After coding the digital signal produced by carrying out the A/D conversion of the audio signal, voice recording playback equipment, such as a digital recorder recorded on the flash memory etc. which are RAM and the nonvolatile semiconductor memory which are semiconductor memory as compressed voice data, is developed.

[0003]There are some which have a function which records the index mark for directing for a secretary, a typist, etc. in such voice recording playback equipment, and this index mark, It is used in order to show the priority relation of voice data at the time of reproduction, or it is used so that search of voice data may become convenient at the time of reproduction.

[0004]

[Problem to be solved by the invention]However, in such voice recording playback equipment, In the case where voice data is passed to others, such as a secretary, a case after time passes, so that it may reproduce, etc., For what purpose the index mark is recorded and whether it is what shows what kind of importance detected the index mark, when it was not after reproducing the voice data portion shown by this index mark, it could not judge it, but it lacked convenience a little.

[0005]This invention is made in light of the above-mentioned circumstances, and it aims at providing a voice recording device, a sound reproduction device, and a speech processing unit which can improve ease at the time of performing search etc. using index information data.

[0006]

[Means for solving problem]In order to attain the above-mentioned purpose, a voice recording device by the 1st invention, To a recording medium which has a voice data area where inputted voice data is recorded, and a management information field where management information concerning this voice data is recorded. An index control means which it is a voice recording device which can record voice data, and can be operated during recording operation, When the above-mentioned index control means is operated during recording

operation, while recording voice data inputted on the above-mentioned voice data area as index voice data. It has a recording control means which records position information on index voice data in this voice data area on the above-mentioned management information field.

[0007]A sound reproduction device by the 2nd invention from a recording medium which has a management information field where management information concerning a voice data area where voice data and index voice data are recorded, management information concerning this voice data, and index voice data is recorded. A mode means for switching which is a sound reproduction device which can reproduce the above-mentioned voice data and the above-mentioned index voice data, and switches reproduction mode containing the 1st reproduction mode and 2nd reproduction mode, It has a reproduction control means which reproduces the above-mentioned voice data and the above-mentioned index voice data at the time of reproduction mode of the above 1st, and reproduces only the above-mentioned index voice data at the time of reproduction mode of the above 2nd.

[0008]A speech processing unit by the 3rd invention to a recording medium which has a voice data area where inputted voice data is recorded, and a management information field where management information concerning this voice data is recorded. An index control means which it is a speech processing unit [it is possible to record voice data and] which can reproduce voice data currently recorded from this recording medium, and can be operated during recording operation, A recording control means which records position information on index voice data in this voice data area on the above-mentioned management information field while recording voice data inputted on the above-mentioned voice data area as index voice data, when the above-mentioned index control means is operated during recording operation, A mode means for switching which switches reproduction mode containing the 1st reproduction mode and 2nd reproduction mode, It has a reproduction control means which reproduces the above-mentioned voice data and the above-mentioned index voice data at the time of reproduction mode of the above 1st, and reproduces only the above-mentioned index voice data at the time of reproduction mode of the above 2nd.

[0009]

[Mode for carrying out the invention]Hereafter, an embodiment of the invention is described with reference to Drawings. Drawing 1 and drawing 2 show one embodiment of this invention, and drawing 1 is a block diagram showing composition of voice recording playback equipment.

[0010]Voice recording playback equipment which is a voice recording device, a sound reproduction device, and a speech processing unit, The microphone 1 which changes a sound into an electrical signal of an analog, and the amplifier (AMP) 2 which amplifies an analog signal outputted from this microphone 1, The low pass filter (LPF) 3 from which an unnecessary high frequency component of the signals amplified by this amplifier 2 is removed, The analog-to-digital (A/D) converter 4 which changes into a digital signal an analog signal outputted from this low pass filter (LPF) 3, The digital signal processing part 5 which is a recording control means elongated at the time of reproduction motion, and served as a reproduction control means while compressing an audio signal outputted from this analog-to-digital (A/D) converter 4 at the time of sound recording operation, It is connected via this digital signal processing part 5 and bus, and has internal memories, such as RAM which achieves a function as a memory area of operating by memorizing temporarily [when processing a digital sound signal outputted from the above-mentioned analog-to-digital (A/D) converter 4], The system control part 6 which is a recording control means which controls this whole voice recording playback equipment including control of the above-mentioned digital signal processing part 5,

and served as a reproduction control means, The recording medium 7 which records a digital sound which is connected with this system control part 6 or the above-mentioned digital signal processing part 5 via the above-mentioned bus, and was compressed, Digital one / analog (D/A) converter 8 which changes into an analog signal a digital sound signal which was read from this recording medium 7 and elongated by the above-mentioned digital signal processing part 5, The low pass filter (LPF) 9 which removes unnecessary high frequency components, such as quantization noise, from an analog signal changed by this digital/analog converter 8, The amplifier (AMP) 10 which amplifies an output of this low pass filter 9, It is an index control means for performing the loudspeaker 11 which carries out [sound] an electric sound signal amplified by this amplifier 10, and carries out sound emission, and various kinds of operational inputs concerning the voice recording playback equipment concerned, and it has the mode means-for-switching slack operation input section 12, and is constituted.

[0011]Record of compressed data to the above-mentioned recording medium 7, read-out of compressed data from this recording medium 7, etc. are controlled by the above-mentioned digital signal processing part 5 here, and voice data is stored in it in this recording medium 7 based on a predetermined format. Namely, a voice data area where voice data inputted into this recording medium 7 is recorded, Where a management information field where management information concerning voice data is recorded is provided and voice data is compressed, while being recorded on a voice data area per frame, An end sector etc. which are a start sector and end position which are starting positions (head position) of the voice data are recorded on a management information field.

[0012]A sound recording button for the above-mentioned operation input section 12 to direct sound recording of voice data, A reproduction button for performing directions which read voice data recorded by the above-mentioned recording medium 7, and are reproduced by the above-mentioned loudspeaker 11, It is constituted including various kinds of manual operation buttons, such as an earth switch which stops operation of sound recording or playback, and an index mark button for recording an index mark further.

[0013]Next, in such voice recording playback equipment, when recording a sound, operation is as follows.

[0014]If a sound recording button of the above-mentioned operation input section 12 is pressed, a sound will be changed into an electrical signal by the above-mentioned microphone 1, and the electrical signal will be inputted into the digital signal processing part 5 via the amplifier 2, the low pass filter 3, and the analog-to-digital converter 4 which were mentioned above.

[0015]A sound inputted is analyzed for example, per frame by making an internal memory of the above-mentioned system control part 6 into workspace, and it compresses and is made to record on the recording medium 7 in this digital signal processing part 5 based on a predetermined format which was mentioned above by performing suitable coding etc.

[0016]In this way, this sound recording operation is suspended in a place in which whose remainder an earth switch of the above-mentioned operation input section 12 was pushed, or was lost to storage capacity of the above-mentioned recording medium 7.

[0017]Voice data recorded after a sound recording button is pushed before an earth switch was pushed is usually saved as one voice file at the recording medium 7.

[0018]Then, operation when reproducing voice data recorded on the recording medium 7 in this way is explained.

[0019]Reproductive operation will be started, if a voice file used as a reproduced object is specified and a

reproduction button of the above-mentioned operation input section 12 is pressed.

[0020]And a management information field of the above-mentioned recording medium 7 is searched by control of the above-mentioned digital signal processing part 5, information, including position information on a specified voice file, i.e., the above-mentioned start sector, an end sector, etc., is retrieved, and voice data recorded based on the information is read.

[0021]Read voice data is once memorized by RAM of the system control part 6, and the system control part 6 supplies voice data to this digital signal processing part 5 by the demand from the above-mentioned digital signal processing part 5. And it is made and elongated and sound emission of the decoding of voice data compressed in this digital signal processing part 5 is carried out as a sound from the loudspeaker 11 via that account digital/analog converter 8 of Gokami, the low pass filter 9, and the amplifier 10.

[0022]In this way, operation of this reproduction is ended in a place which reproduced to the last a voice file of an object which an earth switch of the above-mentioned operation input section 12 is pushed, or is reproduced. A fast forward button and when change of a playback position is already directed with a return button etc., it is the same as that of common voice recording playback equipment to reproduce by moving to the position.

[0023]Next, drawing 2 is a flow chart which shows processing performed when an index mark button is pushed during the above-mentioned recording operation or reproduction motion.

[0024]If it changes to the state where it was pushed from the state where it is not pushed during the above-mentioned recording operation or reproduction motion by carrying out ON operation of the index mark button of the above-mentioned operation input section 12, an interrupt will occur and the above-mentioned system control part 6 will shift control to this index mark button operation processing.

[0025]It judges first whether it is in the midst of performing processing [which / of sound recording or playback] (Step S1), and if this processing is started, in not being [be / it] during sound recording or under playback, either, it will escape from this processing as it is.

[0026]setting to the above-mentioned step S1 on the other hand -- under sound recording -- or when judged with it having been under playback next, it is judged whether the processing was sound recording processing (Step S2).

[0027]When judged with it having been under sound recording here, While the system control part 6 records index-mark recording start position information which is recording position information when it changes to the state where an index mark button was pushed on a management information field of the recording medium 7 (Step S3), Recording processing of voice data to a voice data area of this recording medium 7 is continued (step S4).

[0028]Index-mark recording start position information becomes here for start sector position information which shows a head position of index voice data, for example, and a header part of a voice data file recorded on the recording medium 7 is stored in it as a management information field.

[0029]Then, when it detects whether it changed to the state where an index mark button by which it will be pushed is not pushed as mentioned above (Step S5), and still pushed, it returns to the above-mentioned step S4, and record of voice data is continued.

[0030]When the remaining storage capacity of the recording medium 7 is set to 0 in the midst of processing this step S4, of course, sound recording operation will stop.

[0031]And when judged with having changed to the state where it is not pushed from the state where it was

pushed by carrying out the turn off operation of the index mark button in the above-mentioned step S5.

Index-mark recording-end-position information (for example, end sector position information) which is the recording position information at this time is recorded on the above-mentioned management information field of the recording medium 7 (Step S6), and it escapes from this processing, and returns to the original sound recording processing.

[0032]On the other hand, when judged with it not being under sound recording in the above-mentioned step S2, it will be said that it was in the midst of regenerating. In this case, it is judged whether an index mark is recorded first (Step S7).

[0033]When an index mark is recorded here, index-mark recording start position information is retrieved from a management information field in the above-mentioned recording medium 7 (Step S8), and a playback position is made to jump to a searched index-mark recording start position (step S9).

[0034]And it is judged whether voice data was reproduced from the position (Step S10), index-mark ending position information was detected, and this end position was arrived at (Step S11).

[0035]When not having reached index-mark end position, it returns to the above-mentioned step S10, and reproduction of voice data is continued, and on the other hand, when it ends, or when an index mark is not detected in the above-mentioned step S7, it escapes from this processing. At this time, it may be made to return to the original regeneration, or it does not matter even if it makes it stop the regeneration itself.

[0036]Thus, the order on which voice data and index voice data were recorded at the time of the 1st reproduction mode that is performing the usual reproduction will be reproduced as it is, When it becomes the 2nd reproduction mode as the index mark button operated and shown in Step S11 from Step S7 in this drawing 2, only index voice data will be reproduced.

[0037]In ****, when an index mark button is pushed in the midst of regenerating, are made to perform processing of the above-mentioned step S7 to the step S11, but. Not only this but when an index mark button is pushed, for example at the time of a stop, it may be made to perform these processings. In this case, since reproduction of the usual voice data is not carried out, it serves as the 2nd reproduction mode that reproduces only index voice data.

[0038]When single search mode and continuation search mode are provided selectable and single search mode is chosen, When processing which was mentioned above is performed and continuation search mode is chosen, After processing the above-mentioned step S11, when it detects automatically whether the next index-mark recording start position exists and exists it in the same voice file, it may be made to repeat processing of the above-mentioned step S8 to the step S11.

[0039]In ****, when ON operation of the index mark button was carried out (i.e., when a time of being turned on from OFF is made into a starting position and a turn off operation is carried out) that is, were made to make a time of returning from one again at OFF into end position, but. It may be made to make a time of being pushed on the 2nd time into end position by making a time of an index mark button being pushed on the first time into a starting position.

[0040]By the way, when a witness records a sound with a voice recording device (or voice recording playback equipment) and hands a typist etc. the recorded voice data, while a typist reproduces the contents of oral statement using a sound reproduction device, directions of typing a text can be considered.

[0041]In such a case, as shown in Step S6 from Step S3 mentioned above in a voice recording device which a witness uses, index-mark recording start position information and index-mark recording-end-position

information are recorded, As shown in Step S11 from Step S7 mentioned above on the other hand in a sound reproduction device which a typist uses, what is necessary is just made to perform search of a section starting position by an index mark, and end position, etc., and, in such a case, this invention can be applied effectively.

[0042]When giving index information data to voice data according to such an embodiment, Since not only a mere mark but voice data for indexes can be recorded and voice data for these indexes can be further reproduced easily by pushing an index mark button at the time of reproduction, It becomes possible to include a meaning which it is going to direct to index information data, and the contents, and ease at the time of performing search etc. can be improved.

[0043]It becomes possible to perform more detailed index directions, without constituting intricately, since a starting position and end position of the voice data section for indexes can be directed with a single index mark button.

[0044]Although a position on which an index mark was recorded was searched and it was only performing reproduction from the position conventionally, since end position is also recorded according to this embodiment, it becomes possible to direct as the section a portion which wants to reproduce voice data.

[0045]As for this invention, it is needless to say for various modification and application to be possible within limits which are not limited to an embodiment mentioned above and do not deviate from main point of invention.

[0046][An additional remark] According to the above-mentioned embodiment of this invention which was explained in full detail above, composition like the following can be obtained.

[0047](1) To a recording medium which has a voice data area where inputted voice data is recorded, and a management information field where management information concerning this voice data is recorded. An index control means which it is a voice recording device which can record voice data, and can be operated during recording operation, When the above-mentioned index control means is operated during recording operation, A voice recording device providing a recording control means which records position information on index voice data in this voice data area on the above-mentioned management information field while recording voice data inputted on the above-mentioned voice data area as index voice data.

[0048](2) A voice recording device given in an additional remark (1), wherein position information on index voice data which the above-mentioned recording control means records is a head position and end position of this index voice data.

[0049](3) A voice recording device given in an additional remark (2), wherein the above-mentioned recording control means is what records the above-mentioned head position when the above-mentioned index control means is operated first, and records the above-mentioned end position when this index control means is operated next.

[0050](4) A voice recording device given in an additional remark (2), wherein the above-mentioned recording control means is what records the above-mentioned head position when ON operation of the above-mentioned index control means is carried out, and records the above-mentioned end position when the turn off operation of the above-mentioned index control means is carried out.

[0051](5) A voice data area where voice data and index voice data are recorded, A management information field where management information concerning management information and index voice data concerning this voice data is recorded, A mode means for switching which is a sound reproduction device which can

reproduce the above-mentioned voice data and the above-mentioned index voice data, and switches reproduction mode containing the 1st reproduction mode and 2nd reproduction mode from a recording medium which ****, A sound reproduction device possessing a reproduction control means which reproduces the above-mentioned voice data and the above-mentioned index voice data at the time of reproduction mode of the above 1st, and reproduces only the above-mentioned index voice data at the time of reproduction mode of the above 2nd.

[0052](6) When existence of management information which starts the above-mentioned index voice data from the above-mentioned management information field is searched at the time of reproduction mode of the above 2nd and management information exists, the above-mentioned reproduction control means, A sound reproduction device given in an additional remark (5) being what reads position information on the above-mentioned index voice data, and reproduces only index voice data from the above-mentioned voice data area based on this position information.

[0053](7) The above-mentioned reproduction control means searches management information which starts the above-mentioned index voice data from the above-mentioned management information field at the time of reproduction mode of the above 2nd, A sound reproduction device given in an additional remark (5) being what reads head position information and ending position information of the above-mentioned index voice data based on this management information, and reproduces only index voice data from the above-mentioned voice data area based on this position information.

[0054](8) To a recording medium which has a voice data area where inputted voice data is recorded, and a management information field where management information concerning this voice data is recorded. An index control means which it is a speech processing unit [it is possible to record voice data and] which can reproduce voice data currently recorded from this recording medium, and can be operated during recording operation, When the above-mentioned index control means is operated during recording operation, While recording voice data inputted on the above-mentioned voice data area as index voice data, A recording control means which records position information on index voice data in this voice data area on the above-mentioned management information field, A mode means for switching which switches reproduction mode containing the 1st reproduction mode and 2nd reproduction mode, A speech processing unit possessing a reproduction control means which reproduces the above-mentioned voice data and the above-mentioned index voice data at the time of reproduction mode of the above 1st, and reproduces only the above-mentioned index voice data at the time of reproduction mode of the above 2nd.

[0055]Therefore, according to invention given in an additional remark (1), since index voice data is recorded when an index control means is operated during recording operation, a sound can perform more detailed directions. In this way, it becomes possible to improve ease at the time of performing search etc. using index information data.

[0056]According to invention given in an additional remark (2), while doing so the same effect as invention of a description to an additional remark (1), a position of index voice data in a voice data area can be specified with a head position and end position.

[0057]According to invention given in an additional remark (3), since record of a head position and end position is performed by two operations of an index control means while doing so the same effect as invention of a description to an additional remark (2), it is not necessary to establish two or more control means, and can constitute easily.

[0058]According to invention given in an additional remark (4), since record of a head position and end position is performed by ON operation and a turn off operation of an index control means while doing so the same effect as invention of a description to an additional remark (2), it is not necessary to establish two or more control means, and can constitute easily.

[0059]According to invention given in an additional remark (5), since reproduction of both voice data and index voice data and reproduction of only index voice data can be chosen according to reproduction mode, user-friendliness improves by using properly if needed. In this way, it becomes possible to improve ease at the time of performing search etc. using index information data.

[0060]According to invention given in an additional remark (6), while doing so the same effect as invention of a description to an additional remark (5), when existence of management information is searched and management information exists, it becomes possible by reading position information on index voice data to reproduce only index voice data.

[0061]According to invention given in an additional remark (7), while doing so the same effect as invention of a description to an additional remark (5), it becomes possible by searching management information and reading head position information and ending position information of index voice data to reproduce only index voice data.

[0062]According to invention given in an additional remark (8), since index voice data is recorded when an index control means is operated during recording operation, a sound can perform more detailed directions. Since reproduction of both voice data and index voice data and reproduction of only index voice data can be chosen according to reproduction mode, user-friendliness improves by using properly if needed. In this way, it becomes possible to improve ease at the time of performing search etc. using index information data.

[0063]

[Effect of the Invention]Since index voice data is recorded according to the voice recording device of this invention by Claim 1 when an index control means is operated during recording operation as explained above, a sound can perform more detailed directions. In this way, it becomes possible to improve the ease at the time of performing search etc. using index information data.

[0064]According to the sound reproduction device of this invention by Claim 2, since reproduction of both voice data and index voice data and reproduction of only index voice data can be chosen according to reproduction mode, user-friendliness improves by using properly if needed. In this way, it becomes possible to improve the ease at the time of performing search etc. using index information data.

[0065]Since according to the speech processing unit of this invention by Claim 3 index voice data is recorded when an index control means is operated during recording operation, a sound can perform more detailed directions. Since reproduction of both voice data and index voice data and reproduction of only index voice data can be chosen according to reproduction mode, user-friendliness improves by using properly if needed. In this way, it becomes possible to improve the ease at the time of performing search etc. using index information data.

[Translation done.]